Date Entered 28-JAN-00 Date Updated 23-FEB-04

# NOAA Restoration Center

## San Francisco Bay Oyster Restoration

**Project Description**

The Institute for Fisheries Resources wishes to restore a self-sustaining population of native oysters and create a mixed shellfish aggregation similar to those which created the historic San Francisco Bay shellfish reefs.

| | | | |
|---|---|---|---|
| **Project Nickname** | San Francisco Bay Oyster (RC-99) | | |
| **Location** | Redwood City, San Mateo County, CA, 94063 SWR | | |
| **Program** | Community-based Restoration | **Congressional District** | CA 12, 14 |
| **Lat, Long Coordinates** | -122.2608, 37.5741 | **Land Ownership** | Public |
| **Implementation Start Date** | 01-APR-99 | **Implementation End Date** | 31-MAR-00 |
| **River Basin** | San Francisco Bay | **HUC** | |
| **Geographic Identifier** | San Francisco Bay | **USGS Topo Quad** | San Mateo |
| **Project Status** | Implementation Complete | **Project Type** | Restoration |
| **Project Status Description** | A Final report and manuscript were completed in March 2000. The manuscript titled "16s ribosomal DNA verifies that native oyster (Ostrea lurida) persists in San Francisco Bay" This was prepared for IFR by Dr. Michael Banks of the University of California's Bodega Marine Lab. | | |
| **Landmark** | immediately north and south of the San Mateo bridge. | | |
| **Number of Volunteers** | 48 | **Volunteer Hours** | 600 |
| **Volunteer Description** | Volunteer time was used to collect the oyster samples and help process the data. | | |
| **Proposed Project?** | | **Project Closed?** Y | **FY Completed** 2000 |

***Habitat Information***

| Type | Acres Created | Acres Re-established | Acres Rehabilitated | Acres Enhanced | Acres Protected | Stream Miles | # Plants/ Animals |
|---|---|---|---|---|---|---|---|
| oyster reef | | | 1 | | | | |

***Species Information***

| Commonname | Genus | Species | Population Name | NMFS Status | Species Type |
|---|---|---|---|---|---|
| Oyster, olympia | *Ostrea* | *conchaphila* | | | animal |
| Oyster, eastern | *Crassostrea* | *virginica* | | | animal |

***Partners***

- California Coastal Conservancy
- US Real Estate Investments, Ltd.
- The Packard Foundation
- University of California's Bodega Marine Laboratory
- California Department of Fish and Game

***Restoration Techniques***

- oyster reef construction
- oyster gardening

***Contacts***


William Kier

Institute for Fisheries Resources
P.O. Box 29196

San Francisco, CA 94129
Phone: 415-331-4505 Fax: 415-332-8799
wkier@hooked.net Local

Natalie Cosentino-Manning

NOAA Restoration Center
777 Sonoma Ave
Rm 325
Santa Rosa, CA 95404-6515
Phone: 707-575-6081 Fax: 707-578-3435
Natalie.C-Manning@noaa.gov NOAA


***NOAA Involvement***

- source of funding

**Monitoring Information**

| Characteristic | Type |
|---|---|
| Fauna production rates | Functional |

**Additional Info**

water quality- add parameters; genetic analysis of oysters

***Funding Information***

| Funding Mechanism | FY Awarded | NOAA Contribution | Partnership Contributio | Total Partnership Contribution |
|---|---|---|---|---|
| NOAA Restoration Center | 1999 | $2,500 | $0 | $2,500 |
| **TOTALS** | | $2,500 | $0 | $2,500 |

**Other Non-Federal $** $79,527 **Other Federal $** $0 **Total Project Cost** $82,027

**Funding Recipient** Institute for Fisheries Resources

**Funding Comments**

***Project Abstract***

The small, slow-growing Olympia oyster is native to San Francisco Bay and the West Coast. By the early 1900's, it had disappeared from the bay, and replaced by the mid-size Eastern oyster from the Atlantic seaboard. Before the Gold Rush (1849), there were one or more species of native oyster in San Francisco Bay. Thousands of acres of oyster beds were cultivated on bay tidal flats during the end of the 19th century. Since then, the Bay's aquatic habitats have been severely degraded by the cumulative effects of sedimentation, dredging, filling, domestic and industrial pollution, and an influx of exotic flora and fauna. Only tiny relict groups of oysters can be found in the Bay today - but none occupy the remarkable shellfish reefs that once graced the warm, protected reaches of the south Bay. Since the 1960's, however, federal, State, regional and local governments have invested heavily in cleaning up the waters of the Bay. In the early 1980's, the California Department of Fish and Game demonstrated that spat of eastern and Pacific oysters, those readily available from shellfish nurseries, can be grown successfully in the Bay's waters. The recent discovery of small colonies of Ostreola conchaphila - the native San Francisco Bay oyster, as well as shell reefs near Bair Island and the improved water quality of the Bay, reveals that oysters could once again flourish.

The Institute for Fisheries Resources is working with the NOAA Restoration Center to restore the natural reef habitat of the native San Francisco Bay oyster on a portion of intertidal bayland in San Mateo County. This project took the Department of Fish and Game's work in the 1980's a few steps further by demonstrating that native oysters have survived and can successfully spawn in the Bay, and that the restoration of reef habitats in the Bay involving colonies of native oysters and associated shellfish, is feasible. First, the genetic nature of the oysters discovered in Westpoint Slough will be compared with oyster material excavated from the nearby Belmont Mound Indian midden to establish whether the Westpoint Slough oysters are suitable broodstock for the native oyster project. Broodstock oysters will then be spawned under alternative conditions at the site and then monitored for growth and survival of juveniles. This will establish the most effective means of promoting the recovery of a self-sustaining native oyster population.
The results of this projects may be incorporated into a final native oyster population and habitat restoration strategy to restore oyster populations in San Francisco Bay.

# NOAA Restoration Center

## San Francisco Bay Native Oyster Project

**Project Description**

Save San Francisco Bay Association has implemented a pilot project to restore native oysters (Ostrea lurida) to the bay. As of fall 2001, settlement of native oysters has been observed on the oyster necklaces placed in the bay.

| | | | |
|---|---|---|---|
| **Project Nickname** | Native Oyster Project (RAE-01) | | |
| **Location** | Oakland, Alameda County, CA, 94612 SWR | | |
| **Program** | Community-based Restoration | **Congressional District** | 9, 13 |
| **Lat, Long Coordinates** | -122.3835, 37.8411 | **Land Ownership** | Public |
| **Implementation Start Date** | 01-DEC-01 | **Implementation End Date** | 02-OCT-02 |
| **River Basin** | | **HUC** | |
| **Geographic Identifier** | San Francisco Bay | **USGS Topo Quad** | |
| **Project Status** | Implementation Complete | **Project Type** | Restoration |

**Project Status Description** The native oyster project, begun in July 2001, is a collaboration between Save the Bay, NOAA Fisheries and San Francisco State University, U.C. Davis and many local citizens. The first pahse of the project was completed in November 2002, including community education and volunteer monitoring at all five sites. Save the Bay worked with a total of 475 volunteers at the five sites throughout the project, and documented native oysters at three of the sites. Save the Bay continues to to educate the public about the Native Oyster Project through student and adult outreach programs. Tge project recieved press with recent articles in the San Francisco Chronicle, Save the Bay's Watershed newsletter, and local magazine Bay Nature.

**Landmark** San Pable Creek, Richardson Bay, Coyote Point, Redwood Creek

**Number of Volunteers** 475 **Volunteer Hours** 1000

**Volunteer Description** Save the Bay worked with a total of 475 volunteers at the five sites throughout the project, and documented native oysters at three of the sites

**Proposed Project?** **Project Closed?** Y **FY Completed** 2003

***Habitat Information***

| Type | Acres Created | Acres Re-established | Acres Rehabilitated | Acres Enhanced | Acres Protected | Stream Miles | # Plants/ Animals |
|---|---|---|---|---|---|---|---|
| oyster reef | | 1 | | | | | |

***Species Information***

| Commonname | Genus | Species | Population Name | NMFS Status | Species Type |
|---|---|---|---|---|---|

***Partners***

- Save San Francisco Bay Association
- University of California - Davis
- San Francisco State University

***Restoration Techniques***

- oyster gardening

***Contacts***

Marilyn Latta
Community Restoration Specialist
Save San Francisco Bay Association
1600 Broadway, Suite 300

Oakland, CA 94612
Phone: 510-452-9261 Fax: 510-452-9266
mlatta@savesfbay.org Local

Natalie Cosentino-Manning

NOAA Restoration Center
777 Sonoma Ave
Rm 325
Santa Rosa, CA 95404-6515
Phone: 707-575-6081 Fax: 707-578-3435
Natalie.C-Manning@noaa.gov NOAA

### *NOAA Involvement*

| |
|---|
| source of funding |

### Monitoring Information

| Characteristic | Type |
|---|---|
| spat set | Functional |

**Additional Info**

### *Funding Information*

| Funding Mechanism | FY Awarded | NOAA Contribution | Partnership Contributio | Total Partnership Contribution |
|---|---|---|---|---|
| Restore America's Estuaries | 2001 | $75,000 | $0 | $75,000 |
| **TOTALS** | | $75,000 | $0 | $75,000 |

**Other Non-Federal $** $93,930 **Other Federal $** $75,000 **Total Project Cost** $243,930

**Funding Recipient** Save San Francisco Bay Association

**Funding Comments**

### *Project Abstract*

The native oyster project (Ostrea lurida), begun in July 2001, is a collaboration between Save the Bay, NOAA Fisheries, San Francisco State University (SFSU), U.C. Davis, and many local citizen creek groups around the Bay. The first phase of the project was completed in November 2002, including community education and volunteer monitoring at all five sites. Save The Bay worked with a total of 475 volunteers at the five sites throughout the project and documented native oysters at three of the sites. As of fall 2001, settlement of native oysters has been observed on the oyster necklaces placed in the bay.

# NOAA Restoration Center

## Tomales Bay Native Oyster Restoration

**Project Description**

The main goal of the restoration plan is to restore the native Pacific oyster fishery on a pilot scale in Tomales Bay, CA. The effectiveness of experiementally constructed shell mounds will be tested for effectiveness as recruitment substrata. Volunteers will participate in the project by monitoring rates of recruitment and survival of the oysters at various sites around Tomales Bay.

| | | | |
|---|---|---|---|
| **Project Nickname** | Tomales Bay Oyster (NOAA RC NA17FZ2781) | | |
| **Location** | Marshall, Point Reyes Station, Inverness, Marin County, CA, 94971 SWR | | |
| **Program** | Community-based Restoration | **Congressional District** | CA 6 |
| **Lat, Long Coordinates** | -122.9434, 38.1944 | **Land Ownership** | Both |
| **Implementation Start Date** | 01-JUN-02 | **Implementation End Date** | 30-NOV-03 |
| **River Basin** | Tomales Bay - Drakes Bay | **HUC** | 18050005 |
| **Geographic Identifier** | Tomales Bay | **USGS Topo Quad** | Tomales |
| **Project Status** | Implementation Complete | **Project Type** | Restoration |
| **Project Status Description** | The project is currently in its final stages, all funds have been obligated. Still wainting on final report | | |
| **Landmark** | Tomales Bay | | |
| **Number of Volunteers** | 10 | **Volunteer Hours** | 100 |
| **Volunteer Description** | Volunteers through the National Park Service assissted with monitoring and cataloguing invertebrates that were found on and off the oyster rack areas. | | |
| **Proposed Project?** | | **Project Closed?** N | **FY Completed** 2003 |

***Habitat Information***

| Type | Acres Created | Acres Re-established | Acres Rehabilitated | Acres Enhanced | Acres Protected | Stream Miles | # Plants/ Animals |
|---|---|---|---|---|---|---|---|
| mud/sand flat | | 1 | | | | | |
| oyster reef | | | | | | | |

***Species Information***

| Commonname | Genus | Species | Population Name | NMFS Status | Species Type |
|---|---|---|---|---|---|
| Oyster, olympia | *Ostrea* | *conchaphila* | | | animal |

***Partners***

- University of California - Davis
- Point Reyes National Seashore
- Tomales Bay Watershed Council

***Restoration Techniques***

- oyster reef construction

***Contacts***

Ted Grosholz

University of California - Davis
One Shields Ave

Davis, CA 95616
Phone: 530-752-9151 Fax:
tedgrosholz@ucdavis.edu Local

Natalie Cosentino-Manning

NOAA Restoration Center
777 Sonoma Ave
Rm 325
Santa Rosa, CA 95404-6515
Phone: 707-575-6081 Fax: 707-578-3435
Natalie.C-Manning@noaa.gov NOAA

***NOAA Involvement***

- source of funding

**Monitoring Information**

| Characteristic | Type |
|---|---|
| Fish density/diversity | Structural |
| Benthic invertebrate utilization | Structural |
| spat set | Functional |

**Additional Info**

***Funding Information***

| Funding Mechanism | FY Awarded | NOAA Contribution | Partnership Contributio | Total Partnership Contribution |
|---|---|---|---|---|
| NOAA Restoration Center | 2002 | $58,999 | $0 | $58,999 |
| **TOTALS** | | $58,999 | $0 | $58,999 |

**Other Non-Federal $** $0 **Other Federal $** $63,276 **Total Project Cost** $122,275

**Funding Recipient** University of California - Davis

**Funding Comments**

***Project Abstract***

The main goal of the restoration plan is to test the effectiveness of experimentally constructed shell mounds as recruitment substrata for native oysters. The goal is therefore to investigate how local augmentation of shell material could encourage high rates of natural recruitment.

# NOAA Restoration Center

## Tiburon Oyster Restoration

**Project Description**

To restore native oysters in Richardson Bay Wildlife Sanctuary, Tiburon Audubon will build substrates on which the oyster larvae will settle on. They will have staff and trained volunteers monitor the oysters progress.

| | | | |
|---|---|---|---|
| **Project Nickname** | Tiburon Oyster Restoration IFR Fy2003 | | |
| **Location** | Tiburon, Marin County, CA, 94920 SWR | | |
| **Program** | Community-based Restoration | **Congressional District** | 6 |
| **Lat, Long Coordinates** | 12229903, 3753591 | **Land Ownership** | Private |
| **Implementation Start Date** | 01-MAY-04 | **Implementation End Date** | 01-SEP-04 |
| **River Basin** | San Francisco Bay | **HUC** | 18050004 |
| **Geographic Identifier** | Tiburon Peninsula | **USGS Topo Quad** | San Quentin |
| **Project Status** | Planning Stage | **Project Type** | Restoration |

**Project Status Description**

Current update (6/29/04): The twelve oyster palates were place at the two sites on May 30 and May 31 st 2004.Current Update: Tiburon Audubon has been working on getting permits in place to place the oyster palates in the bay. As they do not currently have the permits in place they have not received any of their allocated funds yet. In the week of January 19 2004 Michele Pearson (Executive Director) and Mike McGowen (Senior Researcher) had a meeting with Adrian Klein of San Francisco Bay Conservation and Development Commission (BCDC) and they went over the permitting requirements for the, ?Administrative Permit Application for a Minor Improvement?. The permit usually takes 30-90 days to process but Ms. Klein believes she can get it through in 60 days. They are submitting the permit application the week of January 26. Audubon just has to contact a few more agencies (local government, coast guard, regional water quality control board, and California Department of Fish and Game) to inform them about the plans to place substrate in the bay. It is anticipated that the Coast Guard will approve this easily as it is within a wildlife sanctuary, the substrates will be small, close to shore, well marked and are not in any boat lanes.
In October they moved the oyster shells to Tiburon Audubon Center from Romberg Center. Through the fall Tiburon Audubon had staff meetings to work out the volunteer structure. They have identified the need for about 40 volunteers, with various levels of responsibility.
Tiburon is looking at end of March or April as a time to put the oyster larvae in water. The departure from their original timetable is of not much concern because the oyster larvae will thrive in the warmer water.

**Landmark** Tiburon Penninsula

**Number of Volunteers** **Volunteer Hours**

**Volunteer Description**

They will have staff and trained volunteers monitor the oysters progress. At montly intervals, the science team, Audubon volunteers and Audubon staff will inspect a sample of oyster shell for recruitment and will measure the growth of settled oysters. In addition the science team will monitor fish use and volunteers will conduct bird surveys, paying special attention to oyster eating birds such as Oyster catchers and Scaup. Water quality will aperameters such as temperature, salinity, and secchi depth will be recorded monthly.

**Proposed Project?** N **Project Closed?** N **FY Completed**

***Habitat Information***

| Type | Acres Created | Acres Re-established | Acres Rehabilitated | Acres Enhanced | Acres Protected | Stream Miles | # Plants/ Animals |
|---|---|---|---|---|---|---|---|
| oyster reef | | | | | | | |

***Species Information***

| Commonname | Genus | Species | Population Name | NMFS Status | Species Type |
|---|---|---|---|---|---|
| Oyster, olympia | *Ostrea* | *conchaphila* | | | animal |

***Partners***

***Restoration Techniques***

oyster reef construction

| |
|---|
| Institute for Fisheries Resources |
| Audubon Naturalists Society |
| National Marine Fisheries Service |

### *Contacts*


Natalie Cosentino-Manning

NOAA Restoration Center
777 Sonoma Ave
Rm 325
Santa Rosa, CA 95404-6515
Phone: 707-575-6081 Fax: 707-578-3435
Natalie.C-Manning@noaa.gov NOAA

Michele Pearson
Executive Director
Tiburon Audubon Center
376 Greenwood Beach Road

Tiburon, CA 94920
Phone: 415-388-2524 Fax: 415-388-0717
Local


### *NOAA Involvement*

| |
|---|
| source of funding |

### Monitoring Information

| Characteristic | Type |
|---|---|
| Temperature | Structural |
| Fish density/diversity | Structural |
| Salinity | Structural |
| Light penetration (Secchi) | Structural |
| Benthic invertebrate utilization | Structural |

**Additional Info**

Other monitoring include oyster spat counts and bird utilization of oyster reefs

### *Funding Information*

| Funding Mechanism | FY Awarded | NOAA Contribution | Partnership Contributio | Total Partnership Contribution |
|---|---|---|---|---|
| Institute for Fisheries Resources | 2003 | $30,025 | $0 | $30,025 |
| **TOTALS** | | $30,025 | $0 | $30,025 |

**Other Non-Federal $** $0 **Other Federal $** $30,025 **Total Project Cost** $60,050

**Funding Recipient** Tiburon Audubon Center

**Funding Comments**

### *Project Abstract*


This project will attempt to restore native oysters through provision of appropriate substrate for oyster larvae to settle on, out-planting oysters to document tjeir growth and survival, and monitoring the interactions occuring between created oyster habitat and surrounding populations of fish and birds. Water quality measurements will also be taken to document the ecological functions of native oyster communities (i.e. filtering)